Department of Energy
Washington, DC 20585

July 14, 2000

Dear Interested Party:

The *Final Environmental Impact Statement for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel* (DOE/EIS-0306) is enclosed for your information. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) and reflects comments received on a draft released in July 1999.

The Department of Energy (DOE) proposes to treat its inventory of sodium-bonded spent nuclear fuel and facilitate its eventual disposition in a future geologic repository. The environmental impact statement (EIS) evaluates the associated potential environmental impacts at one or more spent nuclear fuel management facilities. The EIS analyzes the melt and dilute, electrometallurgical, plutonium-uranium extraction treatment technologies, and packaging in high-integrity cans as treatment alternatives as well as a no-action alternative.

After careful consideration of public comments and programmatic, environmental, nonproliferation, and cost issues, DOE has selected electrometallurgical treatment as its preferred alternative for the treatment and management of all sodium-bonded spent nuclear fuel except for the Fermi-1 blanket fuel. The physical characteristics of the Fermi-1 blanket spent nuclear fuel are such that alternative treatment techniques that currently require additional development may be more appropriate to treat this particular spent fuel. DOE will investigate those alternative techniques and make a final decision regarding the Fermi-1 blanket fuel at a later date.

The final EIS is available on the Office of Nuclear Energy, Science and Technology Web site (www.ne.doe.gov), DOE's NEPA Web site (tis.eh.doe.gov/NEPA), at libraries at the University of South Carolina and University of New Mexico, and at DOE reading rooms in Idaho Falls, Idaho; Aiken, South Carolina; Oak Ridge, Tennessee; Richland, Washington; and Washington, D.C.

Additional copies of the final EIS and the National Research Council's *Electrometallurgical Techniques for DOE Spent Fuel Treatment, Final Report (April 2000)* are available upon request by calling 1-877-450-6904 or by sending an e-mail to sodium.fuel.eis@hq.doe.gov.

We appreciate your continued participation in this decision-making process.

Sincerely,

William D. Magwood, IV, Director
Office of Nuclear Energy, Science
and Technology

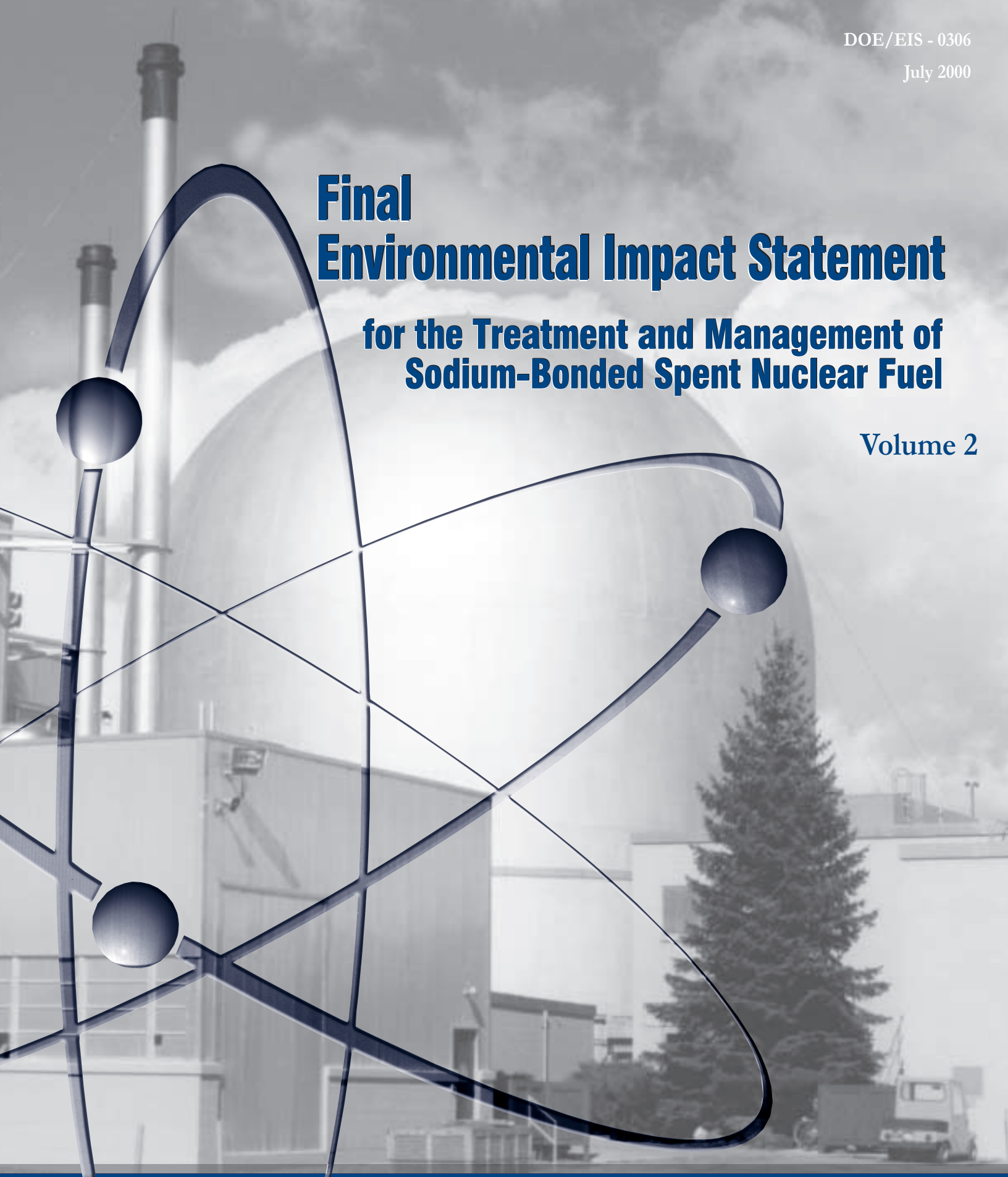
Enclosure

DOE/EIS - 0306
July 2000

Final Environmental Impact Statement

for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel

Volume 2



U.S. Department of Energy
Office of Nuclear Energy,
Science and Technology
Washington, DC 20585

In response to comments on the SBSNF Draft EIS and as a result of information that was unavailable at the time of the issuance of the draft EIS, the final EIS contains revisions and new information. These revisions and new information are indicated by a double underline for minor word changes or by a sidebar in the margin for sentence or larger additions. Appendix A contains the comments received during the public review period of the SBSNF Draft EIS and DOE's responses to these comments.

AVAILABILITY OF THE DRAFT SBSNF EIS

General questions regarding this EIS or for a copy of this EIS, please contact:

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U.S. Department of Energy
19901 Germantown Road
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Attention: SBSNF EIS
Telephone: (301) 903-8755

Printed with soy ink on recycled paper

COVER SHEET

Responsible Agency: United States Department of Energy (DOE)

Title: Final Environmental Impact Statement for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel (SBSNF EIS)

Locations: Idaho, South Carolina

Contact: For copies of this environmental impact statement (EIS), call: 1 (877) 450-6904

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For general information on the DOE National Environmental Policy Act (NEPA) process, contact:

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***Abstract*:** DOE is responsible for the safe and efficient management of its sodium-bonded spent nuclear fuel. This fuel contains metallic sodium, a highly reactive material; metallic uranium, which is also reactive; and in some cases, highly enriched uranium. The presence of reactive materials could complicate the process of qualifying and licensing DOE's sodium-bonded spent nuclear fuel inventory for disposal in a geologic repository. Currently, more than 98 percent of this inventory is located at the Idaho National Engineering and Environmental Laboratory (INEEL), near Idaho Falls, Idaho. In addition, in a 1995 agreement with the State of Idaho, DOE committed to remove all spent nuclear fuel from Idaho by 2035. This EIS evaluates the potential environmental impacts associated with the treatment and management of sodium-bonded spent nuclear fuel in one or more facilities located at Argonne National Laboratory-West (ANL-W) at INEEL and either the F-Canyon or Building 105-L at the Savannah River Site (SRS) near Aiken, South Carolina. DOE has identified and assessed six proposed action alternatives in this EIS. These are: (1) electrometallurgical treatment of all fuel at ANL-W, (2) direct disposal of blanket fuel in high-integrity cans with the sodium removed at ANL-W, (3) plutonium-uranium extraction (PUREX) processing of blanket fuel at SRS, (4) melt and dilute processing of blanket fuel at ANL-W, (5) melt and dilute processing of blanket fuel at SRS, and (6) melt and dilute processing of all fuel at ANL-W. In addition, Alternatives 2 through 5 include the electrometallurgical treatment of driver fuel at ANL-W. Under the No Action Alternative, the EIS evaluates both the continued storage of sodium-bonded spent nuclear fuel until the development of a new treatment technology or direct disposal without treatment. Under all of the alternatives, the affected environment is primarily within 80 kilometers (50 miles) of spent nuclear fuel treatment facilities. Analyses indicate little difference in the environmental impacts among alternatives. DOE has identified electrometallurgical treatment as its Preferred Alternative for the treatment and management of all sodium-bonded spent nuclear fuel, except for the Fermi-1 blanket fuel. The No Action Alternative is preferred for the Fermi-1 blanket spent nuclear fuel.

***Public Comments*:** The draft EIS was issued for public review and comment on July 31, 1999. The comment period ended on September 28, 1999, although late comments were accepted. Public hearings to solicit comments on the draft EIS were held in North Augusta, South Carolina; Boise and Idaho Falls, Idaho; and Arlington, Virginia. All comments were considered during the preparation of the final EIS, which also incorporates additional and new information received since the issuance of the draft EIS. In response to comments on the SBSNF Draft EIS and as a result of information that was unavailable at the time of the issuance of the draft EIS, the final EIS contains revisions and new information. These revisions and new information are indicated by a double underline for minor word changes or by a sidebar in the margin for sentence or larger additions. Appendix A contains the comments received during the public review period of the SBSNF Draft EIS and DOE's responses to these comments. DOE will use the analyses presented in this final EIS as well as other information in preparing the Record of Decision for the treatment and management of its sodium-bonded spent nuclear fuel. DOE will issue this Record of Decision no sooner than 30 days after the U.S. Environmental Protection Agency publishes a notice of availability of this final EIS in the *Federal Register*.

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Appendix I

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ANL	Argonne National Laboratory
ANL-W	Argonne National Laboratory-West
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
DOE	U.S. Department of Energy
EBR-II	Experimental Breeder Reactor-II
EIS	Environmental Impact Statement
EMT	Electrometallurgical Treatment (of spent fuel)
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
FR	*Federal Register*
GMODS	Glass Material Oxidation and Dissolution System
HFEF	Hot Fuel Examination Facility
IAEA	International Atomic Energy Agency
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
P.L.	Public Law
PUREX	Plutonium-Uranium Extraction
RCRA	Resource Conservation and Recovery Act
SBSNF	Sodium-Bonded Spent Nuclear Fuel
SRS	Savannah River Site
U.S.C.	United States Code

Metric Conversion Chart

To Convert Into Metric			*To Convert From Metric*		
If You Know	**Multiply By**	**To Get**	**If You Know**	**Multiply By**	**To Get**
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092903	square meters	square meters	10.7639	square feet
square yards	0.8361	square meters	square meters	1.196	square yards
acres	0.40469	hectares	hectares	2.471	acres
square miles	2.58999	square kilometers	square kilometers	0.3861	square miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.4536	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32, then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	*Symbol*	*Multiplication Factor*
exa-	E	1 000 000 000 000 000 000 = 10^{18}
peta-	P	1 000 000 000 000 000 = 10^{15}
tera-	T	1 000 000 000 000 = 10^{12}
giga-	G	1 000 000 000 = 10^{9}
mega-	M	1 000 000 = 10^{6}
kilo-	k	1 000 = 10^{3}
hecto-	h	100 = 10^{2}
deka-	da	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	µ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001 = 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001 = 10^{-18}